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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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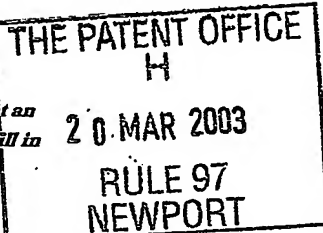
Patents Act 1977  
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21MAR03 E794019-1 C95796  
P01/7700 0.00-0306475.5

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road  
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NP10 8QQ

1. Your reference

MUMAY1

2. Patent application number

(The Patent Office will fill in this part)

20 MAR 2003

0306475.5

3. Full name, address and postcode of the or of each applicant (underline all surnames)

ANDREW MULFORD

29 GAYFIELD SQUARE  
EDINBURGH

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

EH1 3PA

8552347001

4. Title of the invention

MINIATURISED INTEGRATED KEYBOARD

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

29 ~~GAYFIELD SQUARE~~

~~EDINBURGH~~

Kennedys Patent Agency Ltd  
Floor 5, Queen House  
29 St Vincent Place  
Glasgow  
G1 2DT

see 5/177

~~EH1 3PA~~

Patents ADP number (if you know it)

8058240002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

See note (d))

Patents Form 1/77

9. Enter the number of sheets for ☒ of the following items you are filing with this form.  
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Continuation sheets of this form

Description

5

Claim(s)

Abstract

Drawing(s)

5

+5 JML

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Mulford

Date

16 March 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

ANDREW MULFORD 0131 220 2427

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## MINIATURISED INTEGRATED KEYBOARD

1. Background. This invention relates to a miniaturised, keyboard, which integrates the functionality of a full keyboard, a games controller and a mobile phone keypad, whilst also delivering true portability. A number of ergonomic modifications are made but enough of the existing geometry of a standard keyboard, games' controller and mobile phone keypad is retained to ease any resistance (learning or psychological) to changing existing, familiar designs.
2. The Problem This Invention Solves. Current miniaturised keyboards are difficult to use because fingers cannot be miniaturised. Also, most are designed to be used on a desktop, limiting portability. Electronic components will continue to get smaller but fingers will not; current keyboards are the limiting factor in the miniaturisation of future mobile communicators. Keyboards, games controllers and mobile phones have each evolved their own data input and control devices, which require different skills to operate. Current attempts to integrate them have produced miniaturised data input and control devices that are clumsy.
3. What My invention Does. This invention successfully miniaturises a full keyboard to the size of a mobile phone whilst still allowing for 8 finger touch-typing. It also incorporates a mouse stick, a games' controller with joystick and a mobile phone keypad. It changes the main design constraint, for future miniaturisation, from human anatomy to hardware and software developments. This invention also allows for true portability.
4. Essential Features. Accordingly, this invention:
  - a. Integrates the input and control functions of a full keyboard, a games' controller and a mobile phone onto a platform the size of a mobile phone. The slightly different view of touch-typing required is easy to master as it combines skills already learned.
  - b. The novel data input arrangement proposed by this invention is easy to master and allows all functions of a full keyboard, 8-finger touch typing and multi-key strokes (for example Ctrl-Del-Alt).
  - c. The keyboard can be used in an open or a closed mode.

- A. In its 'closed' mode the keyboard is designed specifically to be held and operated by both hands, allowing true portability on trains, planes etc.
  - B. In its 'open' mode the board unfolds to allow desktop use with near normal, 'conventional' touch-typing.
- d. The keyboard can be arranged in a QUERTY format (as demonstrated in the drawings) or in other formats such as the Dvorak layout or other arrangements.
  - e. Almost all keys have multiple functions. On the bottom board the keys also act as both control keys for the upper board and as a mobile phone keypad.
  - f. When used as a games' controller, this invention allows for two-handed play, with a joystick, a multi-directional key, games control keys and triggers that allow for multi-finger play.
  - g. In the mobile phone mode, this invention allows for single-handed use and has the ability to function as a phone inside a carrying pouch.

##### 5. Important Features.

- a. The keyboard would preferably be made of a plastic material to allow ease of manufacture and the ability to utilise colours to facilitate identification of the keys and their function.
- b. Keys would be shaped to optimise ergonomics, in terms of the fingers used to operate them.

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##### 6. Detailed Description and Introduction to the Drawings. A preferred embodiment of the invention will now be described with reference to the accompanying drawings:

- a. Figure 1. Figure 1 shows a plan view of the keyboard in its open configuration with a main screen (1) attached. The main keyboard is split between two boards; a top board (2) and a bottom board (3):

A. The letter and number keys (4) are on the 'top' board (2) arranged in a QWERTY layout, together with a multi-directional key (5) and mouse stick (6).

B. The command keys (7) (shift, space, return, insert, control, alt, delete, home, end, page up, page down, left mouse, right mouse and function) are on the 'bottom board' (3). There is also a mobile phone screen on this board (9).

b. Although the keyboard is split between two boards, when a screen is attached, the resultant communicator actually folds into three. Externally, when closed, it looks and acts like a mobile phone. It opens to reveal the main screen (1) and top board (2). The keyboard then also unfolds further if required. The keyboard can be used in an open or a closed mode.

A. In its 'closed' mode the keyboard is specifically designed to be held and operated by both hands, allowing true portability on trains, planes etc. There are side cut recesses in the boards (10) to allow for ease of grip by the forefinger knuckles. In this mode the keys on the top board (2) are designed to be used with the thumbs, while the keys on the bottom board (3) are designed to be operated by the fingers. The keys are designed to maximise ergonomics; for example the 'petal' shaped keys (8) on the bottom board (3).

B. In its 'open' mode the boards unfold to allow desktop use with near normal, 'conventional' touch-typing. The top board is then operated with the fingers and the bottom board with the thumbs and forefingers. In this configuration it should be noted that the functions ascribed to the keys of the bottom board changes slightly:

(a) The layout of the bottom board is reversed in order to maintain the position of the keys and the relationships between keys, with the closed position. For example the '7' key on the bottom board is ascribed the 'Ctrl' function in the closed mode. In the open mode the Ctrl function moves to the '1' key which now occupies that position.

- (b) The keys of the bottom board provide an additional, keyboard number pad (11); this is not available in the closed mode.
- c. The layout of the command keys on the bottom board is reproduced in shadow form on the upper board to aid location when in the closed mode (12).
- d. On the bottom board the keys act as both control keys for the upper board and as a mobile phone keypad (13).
- e. Figure 2. Figure 2 shows side elevation views of:
  - A. Figure 2a. Mobile phone configuration.
  - B. Figure 2b. Closed (hand held) configuration.
  - C. Figure 2c. Open (desktop) configuration.
- f. Figure 3. Figure 3 shows illustrative finger positions for the boards in the closed configuration:
  - A. The thumbs control the keys on the top board, the left thumb the keys to the left (14), the right thumb the keys to the right (15) and either thumb the keys in the middle (16).
  - B. The forefingers control the keys to the 'front' of the bottom board (17).
  - C. The middle fingers control the keys on the middle row of the bottom board (18).
  - D. The ring fingers control the keys at the 'back' of the bottom board (19).

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- g. Figure 4. Figure 4 shows illustrative finger positions for the boards in the open configuration:
  - A. The top board is divided into regions for the forefingers (17), the middle fingers (18) and the ring fingers (19).

B. The lower board is divided into regions for the thumbs. The left thumb controls the keys to the left (14), the right thumb the keys to the right (15) and either thumb the keys in the middle (16).

h. Figure 5. Figure 5 shows illustrative finger positions when the invention is used as games controller:

A. In this mode, the mouse stick (6) acts as a joystick, which together with the multi-directional key (5) and game control buttons (20) are operated with the thumbs on the top board (2).

i. The trigger buttons (Left 1, Left 2, Right 1 and Right 2, abbreviated as L1, L2, R1 and R2) (21) are operated with the forefingers (17) and ring fingers (19) on the bottom board (3).



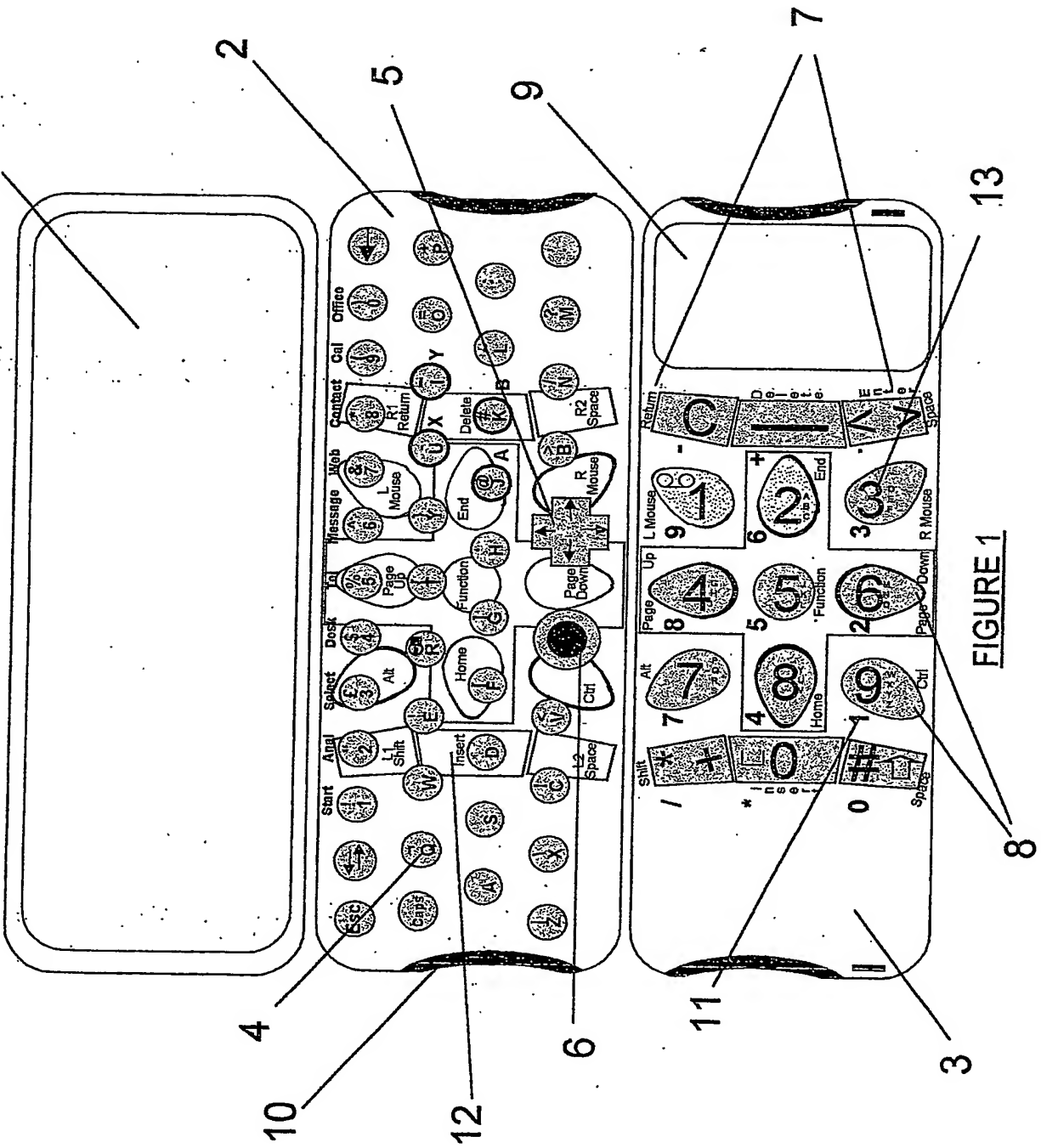
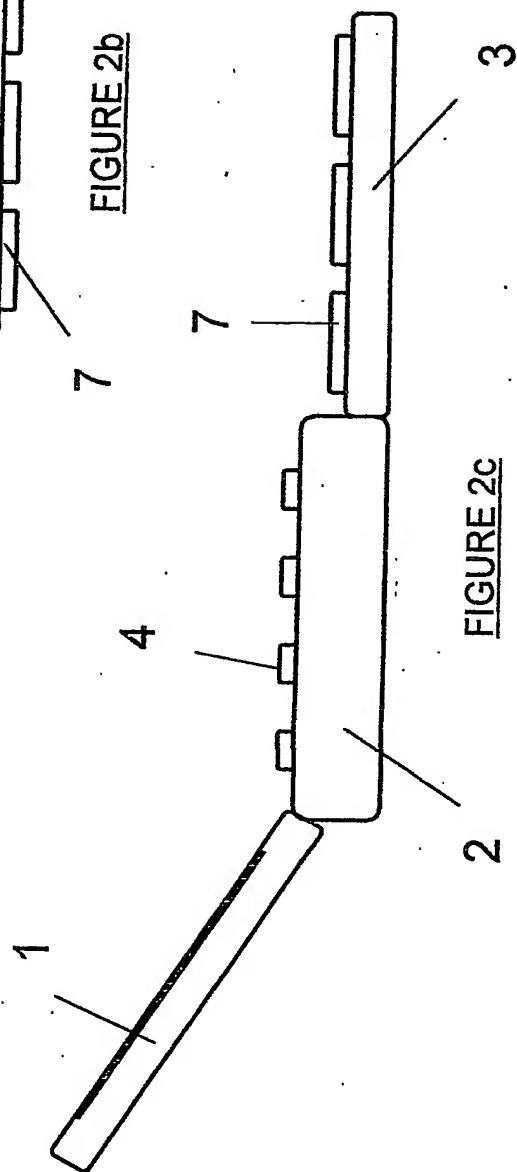
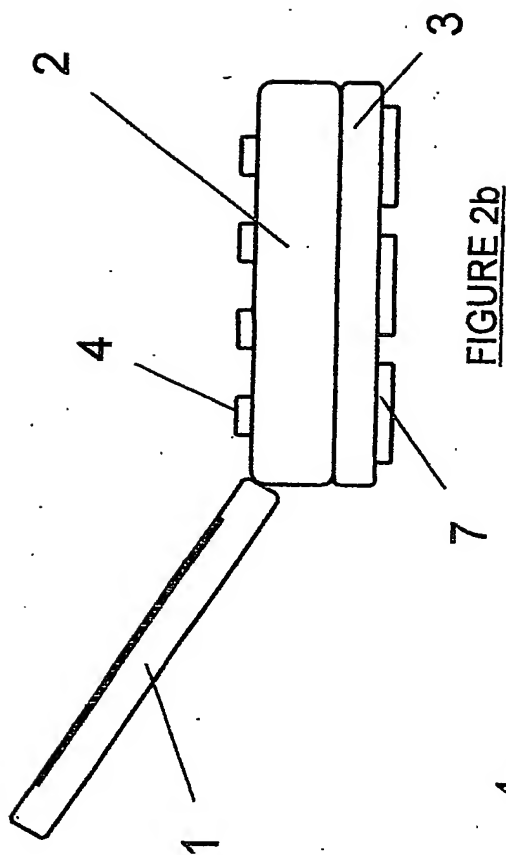
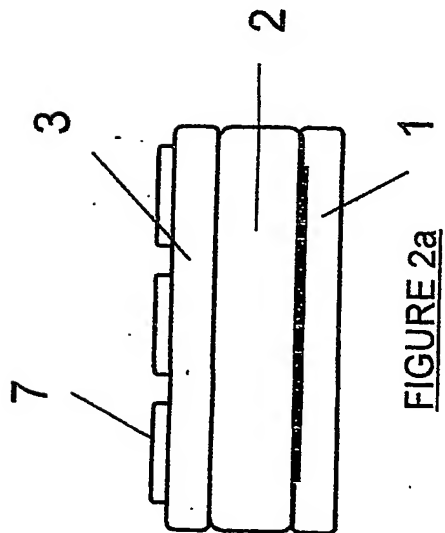


FIGURE 1





**FIGURE 3**

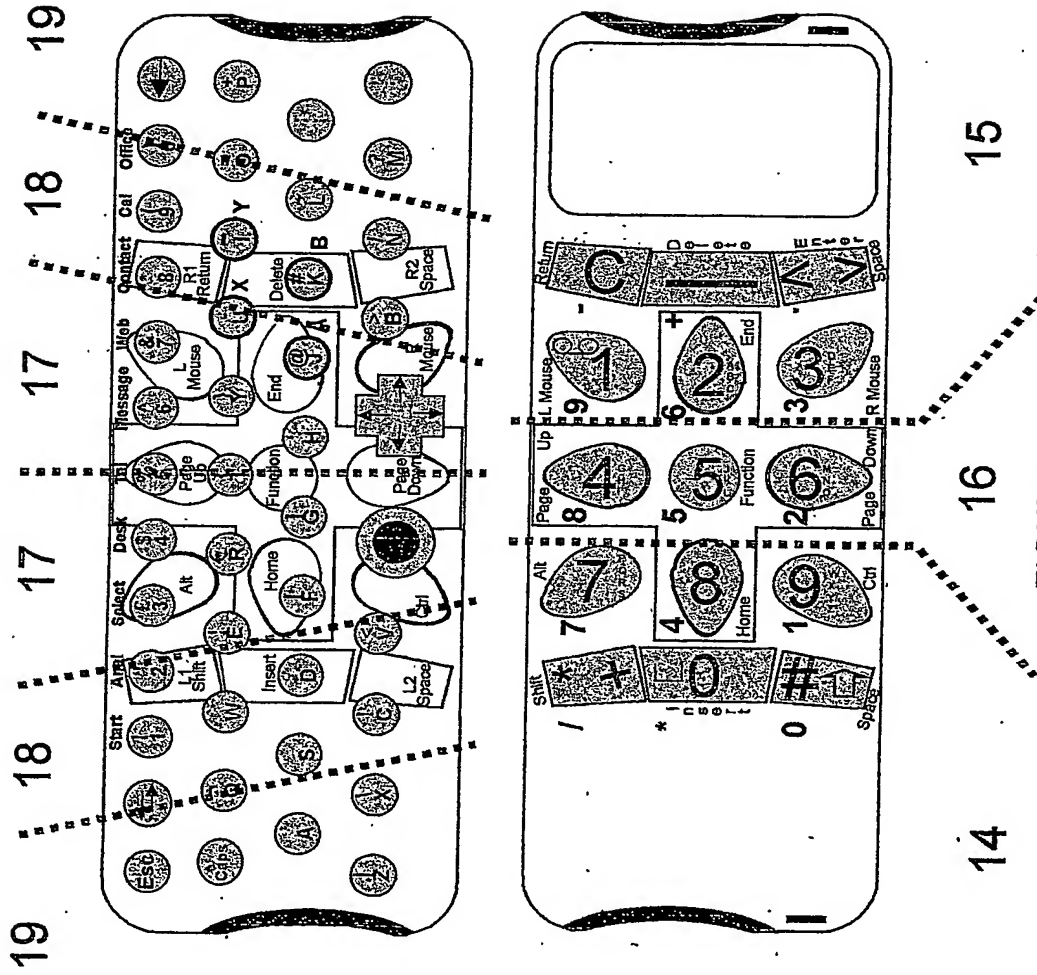


FIGURE 4



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